# Airport & Aircraft Safety R&D Notes

Volume 1, Issue 1 FAA's Airport & Aircraft Safety R&D Division July 1999


## NATIONAL AIRPORT PAVEMENT TEST FACILITY DEDICATED

On April 12, almost two years to the day of the National Airport Pavement Test Facility (NAPTF) ground breaking and with a large group of national and international visitors in attendance, the FAA formally dedicated the new Tech Center facility.

Chris Seher, Director of the Airport and Aircraft Safety Division, AAR-400, served as the master of ceremonies for the event. As Herman Rediess, Director of the Office of Aviation Research, AAR-1, pointed out in his opening remarks, "today we dedicate the first and only full-scale airport pavement test facility in the world capable of producing quality test results from highly instrumented runway pavement sections."

The facility, developed under a cooperative research and development agreement between the FAA and the Boeing Company, is capable of testing airport pavement sections to failure with simulated full-scale traffic loading. Representative Frank LoBiondo (R-NJ) praised this unique arrangement, claiming that such cooperative agreements are "an example of the future." He also added that it is "a very proud day for all of us," praising the Tech Center staff for continually doing "a fabulous job."

Chris Seher with Representative LoBiondo

The test machine is located in a fully enclosed building, which is approximately 1200 feet long, 100 feet wide, and 40 feet high. The pavement test section area, constructed using conventional construction equipment and techniques, is approximately 900 feet long and 60 feet wide. This size permits simultaneous testing of nine different pavement cross sections. Simulated aircraft loading will be applied with an electrically driven vehicle operating on railroad rails. Movable wheel module assemblies permit wheel groups to be moved up to 20 feet laterally and longitudinally, thus simulating a variety of landing gear configurations. Over 1,000 sensors are embedded in the pavement sections to monitor pavement conditions under loads.

Susan Kurland, FAA's Associate Administrator for Airports, pointed out that in

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(PAVEMENT TEST MACHINE, CONTINUED)

the U.S. alone there is 6 billion square feet of runway pavement surface with an estimated replacement value of over $100 billion. Currently, the FAA and airport owners spend about $2 billion annually on pavement projects. The NAPTF will provide the full-scale testing information urgently needed to investigate the performance of airport pavement subjected to the complex gear loads of the new generation of aircraft. The technical data obtained will help validate new design standards and assure compatibility between aircraft and airports throughout the world. That information also will supply an improved scientific basis for further development and refinement of the International Civil Aviation Organization's pavement loading standards for aircraft.

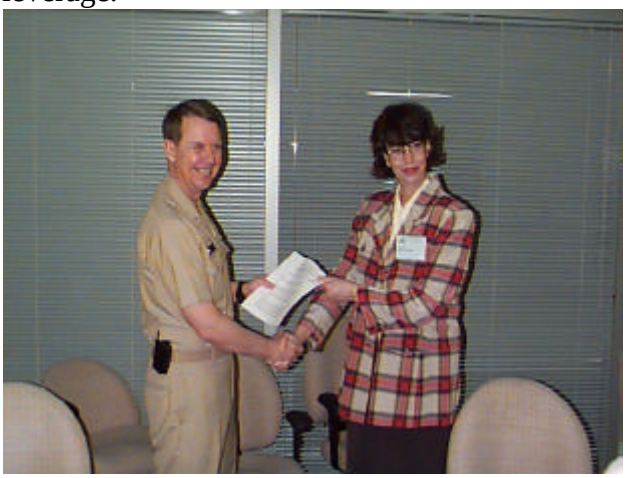
After seeing the facility, David Balloff, a key aviation aide to Representative Jim Duncan (R-TN) commented that the facility will make "great strides in runway and taxiway safety." New Jersey State Senator William Gormley agreed, saying the "facility serves the nation," but added that it is also "a point of pride for Atlantic County."

## FAA, Navy Sign Memorandum of Understanding

The Federal Aviation Administration's Office of Research and Acquisitions and the Naval Air Systems Command have exchanged a Memorandum of Understanding (MOU) for Research, Development, Test, and Evaluation. The purpose of the MOU is to provide a framework for a strategic partnership between the two organizations. This partnership is intended to renew and expand coordination and cooperation in aeronautical and aviation related research and technology.

Dr. Jan Brecht-Clark, Deputy Director of Aviation Research, exchanged the Memorandum with Rear Admiral Joseph W. Dyer, Assistant Commander for Research and Engineering, at a meeting at Naval Air Station, Patuxent River, MD, on April 28. "We have a lot more in common than we've seen before," Brecht-Clark said.

"The FAA has world-class researchers, but we can't do it all. This MOU will be critical in identifying those things we can trade or leverage."



Rear Admiral Joseph A. Dyer, Assistant Commander for Research and Engineering , and Dr. Jan Brecht-Clark, Deputy Director, Office of Aviation Research, exchange the MOU.

This will be especially effective in program areas that are common to both such as aircraft safety, avionics, aging aircraft, maintenance, GPS, and reliability. The MOU creates a partnership between the two agencies to use their personnel and technology to support each other's programs.

Seconding Brecht-Clark's comments, Dyer remarked on the match between the two organizations. "We have obvious synergies. We want to work with you and support you," he said. "In these days of downsizing pressure, there are strategic partnerships that make sense."

Brecht-Clark reported on FAA efforts to develop new processes to improve safety, efficiency, and security in the wake of projected air traffic volume increases. "By the year 2007, the equivalent of the entire population of the United States will be taking a trip by plane every year, resulting in very crowded airports and air space," she said. "The efficiency needed to control that airspace will be incredible. And there is no greater efficiency than a fighter aircraft flying from point to point. We have a goal of reducing fatal commercial mishaps by 80 percent by 2007," she said. "That's the kind of work that can benefit both our fleet and yours."

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(MOU, Continued)

According to Robert Pappas, AAR-430, the first development work under the MOU will be a three-year project involving the Arc Fault Circuit Breaker. The breaker is intended to detect arcing within wire bundles that might not be detected normally. "This can bring about a significant safety improvement."

FAA and Navy representatives expect the MOU will benefit both agencies by reducing costs and providing a broader base of research capabilities. "It's a win-win situation," Brecht-Clark said.

For additional information, contact Thomas O'Brien (AAR-400) at (609) 485-6086 or Robert Pappas (AAR-430) at (609) 485-6181.

# COE Industry Advisory Board Meets

The Airworthiness Assurance Center of Excellence (AACE) Industry Advisory Board (IAB) held its annual meeting at the Fawcett Center at The Ohio State University (OSU) on May 25 - 26. Dr. William Baeslack, Vice-President for Research; Jay Tieber, Deputy Director, Ohio Department of Development; and M. L. Carol Gregorek, AACE Associate Executive Director, provided welcoming remarks.

Various FAA and other invited speakers opened the morning session. Dr. Larry Ilcewicz (ANM-115), FAA National Resource Specialist for Advanced Composite Materials, pledged his support to the group while addressing agency expectations of the AACE/ FAA/Industry/ University partnership. According to Ilcewicz, "the evolution of strong, long-term partnerships between academia and industry is vital to aviation safety and the U.S. economy. Benefits from AACE projects could include faster certification of composites, students experienced in working with industry, training for FAA personnel, and the basis for new regulations for improved safety.

George Marania (AIR-100) and Dr. John Fabry (AAR-430) also provided opening comments.

Both stressed the need to target our resources to work smartly on the critical few interventions with the greatest potential for success.

Fabry stated that a "strategic vision is needed from our industry partners" and their contributions will prove to make a positive impact on overall AACE accomplishments. Dr. Catherine Bigelow, FAA AACE Technical Director, discussed the analytical hierarchical process currently being utilized to make group decisions to prioritize various aircraft safety R&D projects.

Dr. William Shurtleff, AACE Executive Director, located at Iowa State University, presented the most recent five-year R&D plan developed by the COE. Paul Masson of Paul Masson Consulting, provided an overview of public/private technology alliances. Masson discussed various features, benefits, and cautions when working with alliances. He defined alliances as a term used to describe "a way of organizing and binding multiple organizations into a single group to produce jointly results which otherwise cannot be achieved." He stated that common public sector objectives generally achieve cost savings, enhance industry coordination and technology commercialization, and assure faster public policy implementation.

Following a closed session of the industrial board, senior board members provided a presentation to the FAA and AACE Board of Directors. Among those companies represented were Boeing, Pratt & Whitney, Northrop Grumman Commercial Aircraft Division, and US Airways. Jerry Lee, Vice-President of Research and Development, BF Goodrich R&D Center, suggested that a select group from FAA/AACE could visit industry to determine external R&D interests while searching for common problems and themes for needed research solutions. Roy Watanabe, Director, Boeing Commercial Airplanes, tasked the group to obtain greater industry buy-in and to refine enabling goals.

The overall industrial board challenge is to operate AACE as a business enterprise.

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The groups will attempt to work closely together to enhance their mission, business strategy, technology strategy, and refine supporting processes.

All were in agreement that both the Board of Directors and the Industrial Advisory Board would be redefined within the next year to include executive level representatives, those able to control R&D funding.

AACE will host its open annual meeting in Kansas City, KS, on November 16-17. For further information, contact Patricia Watts, FAA COE Program Manager, (609) 485-5043, or by email at patricia.watts@faa.dot.gov.

## HIRF Research

Several reports are being published this fiscal year addressing research studying the effects of High Intensity Radiation Fields (HIRF). The first report, published in March 1999, was entitled "Statistical Study of the Distance of Closest Approach of Aircraft to Ground-Based Emitters." This FAA report determined the closest distance that aircraft fly in proximity to HIRF emitters located at Denver International Airport.

The second report, published in April of 1999, was entitled "Statistical Study of the Closest Approach of Aircraft to Ground-Based Emitters: Results for Seattle and Comparison With Denver." This study was follow-on of the work conducted at Denver Airport to include a similar effort at the Seattle Airport. This report presents the results of the Seattle study with a detailed comparison between the two airports. These two reports were used in conjunction with another research effort for establishing the actual HIRF environment.

A third report, which will be published this year, is entitled "HIRF Risk Analysis." This study assesses the risk of HIRF to fixed-wing transport and non-transport aircraft in the U.S. Results of these research efforts are being used for the development of the High Intensity Radiated Fields (HIRF) Users Guide to be published in FY2000.

Contact: Anthony Wilson, (609) 485-4500

## Aircraft Icing

A report entitled "Survey of Nonglycol and Reduced Glycol Aircraft Deicing Methods" has been published by AAR-421. This report, in part, documents nontraditional and seldom used aircraft deicing methods. With increasing concerns about glycol runoff into the environment, this report makes known alternate methods that have been used successfully. Its wide distribution will, hopefully, provide the incentive for others to investigate into alternate aircraft deicing methods that are more environmentally friendly.

Other reports that have been or will be published in this fiscal year include:

- "Evaluation of Technologies for the Design of Prototype In-Flight Remote Aircraft Icing Potential Detection System."
- "Development of a Method to Test Holdover Times of Deicing and Anti-Icing Fluids in a Cold Room Using Artificially Generated Snow."
- "Snow and Ice Particle Sizes and Mass Concentrations at Altitudes up to 9 km (30,000 ft)."
- "Mixed-Phase Icing Conditions: A Review."
- "Proceedings of Specialists' Workshop on Mixed-Phase and Glaciated Icing Conditions."

In addition, AAR-421, in conjunction with Transport Canada and the SAE, delivered a set of holdover time (HOT) guidelines to AFS-200 and provided final industry-coordinated information on new HOT guidelines for publication in Flight Standards Information Bulletin for Air Transportation (FSAT).

AAR-421 reported to the ARAC Ice Protection Harmonization Working Group (IPHWG) on the Analysis of Supercooled Large Droplet Icing Conditions.

Contact: Paul Boris, (609) 485-5886 and Jim Riley, (609) 485-4144

# FULL-SCALE AIRCRAFT STRUCTURAL TEST EVALUATION AND RESEARCH FACILITY DEDICATED

On February 3, Steve Zaidman, FAA's Associate Administrator for Research and Acquisitions, dedicated the Full-Scale Aircraft Structural Test Evaluation and Research (FASTER) Facility. The new facility is capable of testing full-scale curved-panel specimens under conditions representative of those seen by an aircraft in actual operation. The data obtained from the tests will be used to validate analytical models being developed by the FAA. All testing is monitored using state-of-the-art video equipment for continuous observation.

Steve Zaidman views the FASTER Facility as John Fabry looks on.

Developed under contract with the Boeing Company, the test system features a unique adaptation of mechanical, fluid, and electronic components capable of applying pressurization, longitudinal, hoop, and shear loads to a curved-panel test specimen. A graphical interface allows the operator to control the loads, speed, and type of test desired.

Data acquisition from strain transducers, load transducers, pressure transducers, etc., is displayed on color monitors in real time as well as stored for off-line analysis. A remote video system is integrated with the test rig to track and record crack propagation and measure crack opening during the testing of the curved panels. The video system automatically tracks and records the crack growth and has a very high zoom range to be able to cover the entire test panel and to be able to zoom to the narrow field of view required to observe the crack tip behavior.

Currently, two Drexel University doctoral students in the FAA's University Fellowship program, Mr. Edem Akpan and Mr. Peilin Zhang, are conducting research at the facility. Zhang and Akpan spend 80% of their time at the Tech Center conducting research at the facility. Akpan is concentrating on experimentally quantifying the mechanics of multiple-site crack initiation and growth in fuselage structure. Zhang is primarily concentrating on computational methods to determine fracture parameters governing the onset of widespread fatigue damage in aircraft. Their research is complimentary to the FAA's goal of establishing data to verify and validate analytical methods to predict the onset of widespread fatigue damage. Both gentlemen have been instrumental in setting up and operating the FASTER Facility.

FAA/Drexel Fellows Edem Akpan and Peilin Zhang.

The FAA/Drexel University Fellowship Program was developed to foster research in aviation safety, in particular to assess widespread fatigue damage (WFD) in fuselage structure of aging aircraft. The principle participants of the FAA/Drexel University Fellowship Program are Professor Jonathan Awerbuch, Professor Alan C. W. Lau, and Professor Tein-Min Tan from Drexel University, and Dr. John G. Bakuckas, Jr., Dr. Catherine A. Bigelow, and Dr. Paul W. Tan from the FAA William J. Hughes Technical Center.

For additional information regarding the FASTER Facility or the FAA/Drexel Fellowship Program, please contact Dr. John Bakuckas, Jr., at (609) 485-4784.

# ADVANCED MATERIALS TEAM MEMBERS RECEIVE AGATE CONSORTIUM AWARDS

Peter Shyprykevich, Program Manager for Advanced Materials/Structural Safety, and Donald Oplinger, RPD Manager for Advanced Materials, were presented commendation plaques at the biannual program review meeting of the NASA /General Aviation (GA) Industry consortium for Advanced General Aviation Transport Experiments (AGATE) at Daytona Beach, FL, on April 6, 1999, for their continuing support to the consortium in applications of composite materials to small aircraft.

NASA initiated the AGATE consortium in 1994 as a means of revitalizing the US General Aviation aircraft industry. They have been pursuing improvements to GA aircraft on several broad fronts: avionics; reduced icing in GA aircraft; improved training for GA pilots; improved engines for low-cost GA aircraft; and greater introduction of composites into airframe components as a means of achieving the competitive advantages of lower cost combined with improved performance.

In the late 1990s there has been a marked upsurge in the application of composites to airframe components in small-to-medium sized aircraft, to a considerable extent because of the activities of AGATE and in particular of the Integrated Design and Manufacturing (ID&M) subprogram of AGATE. ID&M provides for the application of composites to airframe components. By providing a conduit between the FAA's Advanced Materials Program and AGATE consortium, AAR-400 personnel at the Technical Center have provided highly important technical guidance and have made data available as well as bringing fundings from the Advanced Materials Program to bear on problems encountered by the AGATE consortium. These problems have been major obstacles to achieving the goal of developing a low-cost composite GA aircraft within the 1994-2001 time frame.

In particular, the Advanced Materials Team's expertise and involvement in AGATE have contributed in a crucial way to a new process which will provide an FAA-approved material database that can be used by small, emerging companies wishing to develop and certificate new composite small airplane designs.

Peter Shyprykevich and Donald Oplinger display their awards, with them is Dr. Catherine Bigelow.

Streamlined procedures for determining statistically validated structural allowables for candidate composite materials have resulted in significant cost and time reductions. The standard procedures previously used typically cost $500,000 for individual aircraft developers and took 3 years to complete. The streamlined procedure developed by the ID&M consortium now requires only $50,000 and 6 months for participating AGATE/ID&M companies. The development of the streamlined procedures could not have been accomplished without the significant technical support from the FAA's Advanced Materials Program. In fact, the qualification document for determining the design allowables is based on published work of Mr. Shyprykevich. The FAA's Small-Airplane Directorate, the agency lead on the AGATE program, considers the new process a breakthrough that will have positive benefits, not only for the small-airplane industry but possibly for rotorcraft and transport aircraft, for years to come. Two members of the AGATE consortium, Pacific Aviation Composites and Cirrus Design Corporation (who have recently certificated the Columbia 300 and SR-20 single propeller, four-seat, all composite aircraft, respectively) are recent examples of small companies that could not have economically developed these revolutionary aircraft without the benefit of the streamlined certification procedures introduced under AGATE/ID&M.

# FAA / AANC NOTES
# Testing at FAA Airworthiness Assurance NDI Validation Center
## March - May 1999

**Composite Doubler Designs and NDI for DC-10 Aircraft** — A comprehensive design, analysis, and NDI validation report, which will serve as the basis for approving the composite repairs for widespread use, has been submitted to the FAA. Meetings were held with the FAA Los Angeles Aircraft Certification Office and Federal Express to discuss the DC-10/MD-11 composite doubler repair program. Approval was received to proceed with the application of composite doublers to FedEx aircraft for the pilot program. This project is now ready to enter into the doubler installation phase on operating aircraft. After a minimum of five doublers have successfully passed a one-year evaluation, Boeing will petition the FAA to revise its DC-10 and MD-11 Structural Repair Manuals (SRM). Before any installations can be performed it will be necessary to conduct a workshop at FedEx. Plans for the workshop are in process. To facilitate the repairs in the FedEx maintenance hangar, an Engineering Authorization (EA) must be produced to generate all of the necessary work cards. The FAA/AANC is working with FedEx engineering to develop the EA. Point of Contact: Dennis Roach, FAA/AANC, (505) 844-6078

**Visual Inspection Reliability Program** — The FAA/AANC has completed a preliminary experimental design to assess the effect of alerting inspectors to specific inspection locations and potential flaws on aircraft. Alerting an inspector to a specific problem at a specific location should increase the probability of detecting that flaw, if it is present. However, characterization of the effect on detection rates of other non-alerted flaws has not been done. Concerns over the effect of directed inspections in work instructions have been expressed, but quantitative data have never been gathered. This program represents the first attempt at addressing this issue quantitatively. The program will use the FAA's B737 testbed at the FAA/AANC. The Visual Inspection Reliability Program completed a Benchmark study in 1996 using 12 inspectors and multiple job cards on that testbed. The inspector-to-inspector variation estimated in that program has been used to establish a need for approximately 40 inspectors in the ongoing program. The ultimate impact of this program will be data supported recommendations for better work instructions and visual inspection approaches. The experimental design will be reviewed with airline inspection personnel and their participation in the experimental program through supplying inspectors will be sought. Inspections should begin during the summer of 1999 and be completed in spring of 2000. Point of Contact: Floyd W. Spencer, FAA/AANC, (505) 844-5647

**Engine Component Reliability Program** — This program was begun late last fiscal year and initiated an effort by the FAA/AANC to begin the formation of a test specimen library for aircraft engine components similar to the library of specimens that the FAA/AANC has collected of aircraft structural items. As is being done for the library of structural specimens, the ultimate goal of this program is to have a comprehensive set of engine specimens with a range of flaws available to the FAA and its university and private contractors for use in testing and validation experiment activities. To date, numerous government and industrial contacts have been made and agreements formulated to provide the FAA/AANC with candidate test specimens of disk and blade components that have been rejected or condemned for various causes. These will be assessed for their usability as test specimens in a test specimen library and their flaw profiles studied and later characterized in a more detailed manner. If you have or know of additional sources of candidate engine components or for additional program information call Craig Jones, (505) 843-8722 at the FAA/AANC.

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# FAA / AANC NOTES Continued

**Inspection of Sikorsky HH-60J Main Rotor Hub for the United States Coast Guard.** — The FAA/AANC is supporting the United States Coast Guard Aircraft Repair and Supply Center by providing specific eddy-current training for Coast Guard inspectors. Twenty-nine inspectors have been trained to date at six different air stations. Training has taken place at Elizabeth City, NC; Cape Cod, MA; Astoria, OR; San Diego, CA; and Sitka and Kodiak, AK. Future air stations included in the program are Mobile, AL, and Clearwater, FL. The motivation for this training is the recent inspection interval change for this hub assembly from a 600-hour, one-time inspection to a 150-hour recurring inspection.

Coast Guard team inspects the main rotor hub of a Sikorsky HH-60J

FAA/AANC has provided each air station with training materials and test specimens to practice the inspection technique. The 16 hours of intensive inspection training gives each inspector the ability to detect fatigue cracks in the main rotor hub damper bracket flange arm. The procedure uses an impedance plane eddy-current instrument with high-frequency pencil probes. After the inspectors complete the eddy-current training, each inspection team is assessed on an actual aircraft. Point of Contact: Craig Jones and David Moore, FAA/AANC (505) 844-7095

**Air Force Structural Repair and Inspection Program** — The FAA/AANC is participating on a Boeing team to produce the next generation MAUS inspection system (MAUS V). The project is part of the Air Force Structural Repair of Aging Aircraft Program. The project seeks to develop an enhanced NDE system for improved inspection productivity and reliability. The applications include crack and corrosion flaws in metal and composite structures on B-52, KC-135, and E-3 aircraft. In addition to software enhancements, one of the primary hardware additions will allow for accurate probe placement over rivets and improved crack detection in thick skins. The program also includes a data fusion effort, which seeks to superimpose results from multiple NDI techniques with finite element models so that flaw profiles can be assessed simultaneously with their expected affects on structural strength and fatigue. Team members include multiple Boeing facilities, WPAFB, TAFB, the FAA/AANC, and the Univ. of Dayton. Test specimens are currently being designed and large aircraft panels have been acquired from Davis-Monthem Air Force Base. Point of Contact: Dennis Roach, FAA/AANC, (505) 844-6078.

**The FAA Cargo Hauling, Inspection & Procedures Workshop** — Thirty-six attendees from around the continental U.S., Alaska, and Hawaii participated in this Aviation Safety Inspector (ASI ) Workshop at the FAA/AANC. At the workshop, they heard about recent issues and unique concerns relating to cargo aircraft structural issues, and discussed the FAA's interpretation of existing (and some planned revisions to) regulations pertaining to the handling, certification, inspection, and operation of cargo aircraft. The purpose of the workshop was to review the content and impact of the Boeing 727 supplemental structural inspection document and cargo floor airworthiness directives (ADs).

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## FAA / AANC NOTES, Continued

The implementation of these ADs by the operators would benefit from the ASIs having a better knowledge of what the ADs are and are not. The workshop also gave the ASIs hands-on information regarding the determination of the primary structural elements, inspection techniques, use of damage tolerance rating form, cargo loading procedure issues, and inspection tasks for surveillance of cargo operators. Cargo containers used in the workshop were donated by Evergreen International Airlines and Delta Air Lines. The FAA/AANC B737 testbed aircraft and DC-9 structural nose section were also used as hands-on instructional aids. The Seattle Aircraft Evaluation Group, representatives of the Transport Airplane Directorate, AFS-300 and -600, and Fred Sobeck from Flight Standards conducted the workshop. Point of Contact: Craig Jones, FAA/AANC (505) 843-8722

## Fabry, Lofaro Take on New Assignments

The original goal of the Airworthiness Assurance Center of Excellence (AACE) was to harness some of the leading minds in the country from academia, industry, and government in a long-term, cost-sharing partnership for the public good. To further this goal the FAA has instituted a number of actions aimed at strengthening the organization and broadening the base of government support to the Center.

Dr. John Fabry is being reassigned as the FAA liaison to the Naval Air Systems Command (NAVAIRSYSCOM) headquartered at Naval Air Station Patuxent River, Maryland, and Dr. Ron Lofaro is being reassigned as the FAA liaison to the United States Air Force Research Laboratory (AFRL) at Wright-Patterson Air Force Base, Ohio. Together they will work with the respective services, acting as the FAA focal points for the coordination and integration of Air Force and Navy R&D programs that enable aviation safety, with emphasis on airworthiness assurance.

Dr. Fabry and Dr. Lofaro will maintain contact and liaison with high ranking scientific and engineering personnel in industry, academia, and government and will provide peer advisory service and an FAA presence at various meetings, seminars, committees, user group panels, and conferences.

Under the terms of an Interchange Assignment Agreement (IAA) between the FAA and Princeton University, Dr. Fabry will be assigned to the Laboratory for Control and Automation and will be primarily involved in research related to control and estimation theory, optimization, system identification, control system design, machine intelligence, and human factors, with particular emphasis on aerospace systems. This assignment aimed at coordinating FAA, Navy, and NASA research activities.

The assignment involves a broad range of basic research in support of the following FAA programs areas; Aircraft Catastrophic Failure Prevention (conducting research to identify and prevent aircraft system problems that could result in a catastrophic aircraft failure), Aging Aircraft (developing the means to evaluate and ensure safety and reduce the risks associated with aging aircraft structures), Propulsion and Fuel Systems (addressing safety issues as new fuels and materials are employed in the next generation aircraft), Advanced Materials (developing information and standards for certifying aircraft made from composite and advanced materials to support certification and airworthiness regulations), and Structural Safety (addressing crashworthiness structural safety and ways to increase protection for both occupants and crew during an accident). As an example the Department of Mechanical and Aerospace Engineering at Princeton University is currently conducting research on methods for designing flight control systems that compensate for potentially catastrophic failures of transport aircraft systems.

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Dr. Fabry is currently the Airworthiness Assurance R&D Branch Manager, and in this capacity he directs and manages all administrative and technical activities necessary to accomplish the goals and objectives of specified Aircraft Safety Technology research activities contained in the FAA Plan for Research, Engineering, and Development.

Dr. Lofaro will be responsible for coordinating and integrating the research, development, and acquisition of complex and highly integrated technology and advanced equipment and systems required for establishing and maintaining safe, efficient, productive, and cost-effective operations impacting civil aviation safety. He will work with the various USAF Directorates that comprise AFRL and the universities involved in AACE management in developing, integrating, and coordinating R&D efforts to resolve critical safety-related issues. Dr. Lofaro is currently the manager for the FAA's Maintenance, Inspection, and Repair Section in the Airworthiness Assurance R&D Program. Dr Lofaro came to the Technical Center from FAA HQ in 1993. While at FAA HQ, as aviation psychologist/project manager, he worked on nine major R&D efforts with NASA, USN, USAF, and various Universities. His R&D work encompassed human factors R&D in flightcrew training, performance, and assessment. Before that, he spent 5 years at the ARI Aviation R&D Unit (US Army Aviation Command) in Alabama, where he was "Researcher of the Year" in 1988. His Army Aviation work included human performance error in the cockpit; air-to-air combat training assessment; flight simulator training issues; and aviator selection and classification. He has published over 55 articles and book chapters on Crew Resource Management (CRM), Line Oriented Flight Training (LOFT); Aeronautical Decision Making (ADM); aviator selection and classification; Air Traffic Controller selection; aviation safety; aircrew/pilot training and performance evaluation; aviation security human factors; aviation maintenance human factors; and maintenance resource management (MRM) training.

# Publication

The recently published Characterization of Early Stages of Corrosion Fatigue in Aircraft Skin**,** Phase II: Interpretation of Corrosion-Fatigue Fracture Surfaces in Alclad 2024-T3 Aluminum Alloy Sheet, DOT/FAA/AR-99/34, describes new methods which were developed and applied to extract and interpret information from the fracture surfaces of corrosion-fatigue specimens of clad and bare 2024-T3 aluminum sheet.


## Airport & Aircraft Safety R&D Notes

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